

(12) **INTERNATIONAL APPLICATION PUBLISHED UNDER
THE PATENT COOPERATION TREATY (PCT)**

(19) World Intellectual Property Organization [WIPO] [Bar Code]
International Bureau

(43) International Publication Date (10) International Publication Number
May 21, 2004 (05/21/2004) PCT WO 2004/042242 A1

(51) International Patent Classification⁷: F16B 39/02 (72) Inventor; and

(73) Inventor/Applicant (U.S. only): METZGER, Heinz
[DE/DE]; Bedelshoferweg 35, 73230 Kirchheim
(DE).

(21) International Application No.: PCT/EP2003/011777 (74) Representative: BARTELS AND PARTNER, Lange

Strasse 51, 70174 Stuttgart (DE).

(22) International Filing Date: October 24, 2003 (10/24/2003) (81) Designated States (national): AE, AG, AL, AM, AT,

AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EG, EE, EG-ES,
FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI,
NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, SY, TI, TM, TN, TR, TT, TZ, UA, UG,
US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Language in which the international application was

originally filed: German (84) Designated States (regional): ARIPO Patent (GH, GM,

KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW).

(26) Language in which the international application is

published: German

(30) Priority Data:
102 52 780.6 November 7, 2002 (11/07/2002) DE

(71) Applicant (for all designated states except the US):
SPIETH MASCHINENELEMENTE GMBH &
CO KG [DE/DE]; Alleenstr. 41, 73730 Esslingen (DE).

{continued on next page}

(54) Title: 48499

Patent Application

of

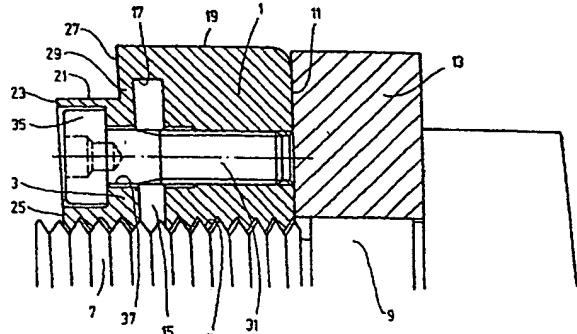
HEINZ METZGER

for

THREADED RING FOR LOCKING ON A THREADED SPINDLE



WO 2004/042242 A1



(57) Abstract: The invention relates to a threaded ring having a single-component body provided with an internal screw thread and consisting of two parts (1 and 3). The first part forms an adjusting ring having an end face (11) located in a radial plane, and the second part (3) forms a retaining ring which is connected to the first part (1) of the body by means of an elastically flexible wall part (29) of the body, forming a gap (15) between the two parts of the body (1 and 3), and comprises an actuating device (31) by which means the geometry of the gap (15) can be adjusted due to the elastic flexibility of the wall element (29). The second part (3) of the body used as a retaining ring has a peripheral region (21) for the formation of the elastically flexible wall element (29), which has a smaller outer diameter than the first part (1), the outer diameter of said peripheral region being located on a smaller radius than the radially outer end (17) of the gap (15) which, in turn, is located on a smaller radius than the periphery (19) of the first part (1) of the body. The peripheral region (21) of the second part (3), with a reduced diameter, ends at an axial distance from the gap (15), defining the extension of the flexible wall element (29) in the axial direction.

(57) Zusammenfassung: Bei einem Gewindering, dessen mit Innengewinde versehener, einstückiger Körper zwei Körperteile 1 und 3 aufweist, deren erster einen Stellring mit einer endseitigen, in einer Radialebene liegenden Planfläche 11 bildet und deren zweiter Körperteil 3 einen Sicherungsring bildet, der mit dem ersten Körperteil 1 unter Bildung eines

[Fortsetzung auf der nächsten Seite]

WO 2004/042242 A1

[Bar Code]

Eurasian Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM); European Patent (AT, BE, GB, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR); OAPI Patent (BF, BJ, CR, CG, CI, CM, GA, GN, GG, GW, ML, MR, NE, SN, TD, TG).

Reference is made for an explanation of the two-letter codes and the other abbreviations to the Guidance Notes on Codes and Abbreviations in the front section of each regular PCT Gazette edition.

Published:

With International Search Report.

~~Spieth Maschinenelemente GmbH & Co, KG,
Alleenstr. 41, 73730 Esslingen~~

Threaded Ring

Background of the Present Invention

The present invention relates to a threaded ring, the having a one-piece body of which is provided with internal threading, has and two body components one of which. One body component is in the form of a set collar with a planeplanar surface on the end in a radial plane and the. The other body component of which forms a retaining ring which is connected to the first component to form a gap positioned between the two body components by way of an elastically flexible wall component and which has an. An actuating mechanism by means of which permits the geometry of the gap may to be adjusted on the basis of the elastic flexibility of the wall component

Background of the Invention

Threaded rings of this type, which have been are disclosed in DE Patent Application 1 675 685, for example, are commercially available, and are applied in various areas of mechanical engineering. The body component forming the planeplanar face serves as a high-precision nut seated on the external threading of a shaft or spindle, a nut the. The axial position of which the

nut may be determined with high accuracy by means of the second body component functioning as a retaining ring, the. The threaded flank clearance present between external threading and internal threading being is eliminated by suitably modifying the gap between the two body components by means of the actuating device, such. Such modification being is made possible by the elastic flexibility of the wall component joining the body components. Set screws which permit reciprocal tightening of the set collar and the retaining ring may be provided as actuating mechanism.

The set collar may function as an adjusting nut the. The end face of which the set collar forms a contact surface for positioning of rolling bearings on shafts or as a precisely positioned shaft collar or the like.

In the instances of the disclosed threaded ring described in the foregoing, the gap between the body components is formed by two gap sections offset from each other in the axial direction, one of which. One gap section extends from the threaded bore to the vicinity of the circumference of the threaded ring and the. The other gap section extends radially inward from the circumferential surface to the vicinity of the threaded bore. The two gap sections are separated by the elastically flexible wall component which connects the two body components and the. The wall thickness selected for which the flexible wall component is such that this wall component is sufficiently elastically flexible enough so that the geometry of the gap may be adjusted by the set screws serving. The set screws serve as an actuating mechanism so that the threaded flank clearance is eliminated, and the retaining effect desired is achieved by tensioning the two body components.

The relatively high production cost is a disadvantage of the disclosed threaded ring.—The

Summary of the Invention

An object of the present invention accordingly is to create provide a threaded ring of the this type under consideration, which may be produced cost effectively by simple means.

It is claimed for the According to the present invention that, this object is attained with a threaded ring of the type indicated in the foregoing in that where the second body component serving serves as retaining ring, and has a circumferential area for formation of the forming an elastically flexible wall component, the. The external diameter of which that circumferential area is reduced in diameter in comparison to that of the first body component,. The circumferential area diameter which extends over a radius smaller than that of the radially external end of the gap, which. The gap radius, in turn, extends over a radius smaller than the circumference of the first body component, and in that the. The circumferential area of reduced diameter of the second body component ends at an axial distance which defines the extent of the flexible wall component in the axial direction.

In that, as claimed for For the present invention, the elastically flexible wall component is not formed by two separate gap sections which between themselves delimit the wall component; but rather. Rather, a circumferential area of reduced diameter is formed which ends a certain distance from the gap in the axial direction the. The radially external end of which the gap extends over a radius larger than that of the circumferential area in question, there is obtained, in the area of the step which joins joining the circumferential area of reduced diameter to the circumference of the first body component, a. A wall component adjoining adjoins the gap which and extends in the axial direction to a distance corresponding to the distance between the gap and the end of the circumferential area of reduced diameter. The value selected for this distance determining the thickness of the wall component is such that the elastic flexibility desired for this wall component is achieved.

In the solution claimed for the invention, ~~The production of two gap sections for formation of the flexible wall component is replaced in the present invention by production of a single one-part gap as an internal recess and the.~~ The external machining of the second body component is required in order in particular areas to reduce the external diameter of this body component. This reduction may be accomplished by simple machining, so that production of the threaded ring ~~claimed for the~~ of the present invention is greatly simplified. ~~It is to be regarded as an~~ An additional advantage is provided in that no gap section open to the exterior is present on the threaded ring, ~~and accordingly.~~ Accordingly, the threaded ring ~~claimed for the~~ of the present invention has a closed circumferential profile. Among other things this, ~~this closed circumferential profile prevents the danger of possible deposit of foreign substances during operation in the open gap area on the circumference, such as impurities in lubricants, abraded particles, chips, or the like,~~ something which. Such deposit might lead to the formation of an unbalancing mass on the circumference of the threaded ring.

The circumferential area of reduced external diameter of the second body component preferably is in the form of a cylindrical circumferential surface which extends through the end edge adjacent to the end surface of the second body component to the flexible wall component. Production of a circumferential surface extending from the end edge is extremely simple from the viewpoint of production technology.

The actuating mechanism for modifying the geometry of the gap may include conventional set screws ~~which are uniformly distributed over a coaxial graduated circle,~~ The set screws extend through the gap in parallel with the axis, and rest by way of their screw heads on the second body component.

The invention will be described in greater detail below with reference to an exemplary embodiment illustrated in the drawing, in which

Other objects, advantages and salient features of the present invention will become apparent from the following detailed description, which, taken in conjunction with the annexed drawings, discloses a preferred embodiment of the present invention.

Brief Description of the Drawings

Referring to the drawings which form a part of this disclosure:

FIG. 1 presents a longitudinal is a side elevational view in section of only one-half side of an exemplary embodiment of the a threaded ring claimed for the according to the present invention on a threaded spindle, the diagram illustration being simplified for the sake of greater clarity of presentation of the principle of operation and in particular with the threaded flank clearance being shown enlarged and the threaded ring being shown in the unlocked state; and

FIG. 2 a diagram corresponding to that of FIG. 2 is a side elevational view in section of the threaded ring of FIG. 1, but with the screw-on threaded ring shown locked in position.

Detailed Description of the Invention

The threaded ring shown in FIG. 1 has two primary components, specifically a first body component 1 which functions as set collar or adjusting nut and a second body component 3 which forms a retaining ring. The two body components 1 and 3 are provided with continuous internal threading 5 by way of which they are screwed on a section of a spindle 9 provided with external threading 7. The body component 1 has on the end a plane planar surface 11 which functions as functioning as contact surface for fixing in the position of an annular component 13 which is seated on the spindle 9 as shaft collar.

There is between Between the two body components 1 and 3, a gap 15 which extends in the radial direction from the internal threading and the A radially outer end 17 of

which the gap is spaced at a radial distance from the circumference or circumferential area 19 of the first body component 1. The second body component 3 has a circumferential area 21 which is with a smaller in-external diameter than the external circumference 19 of the first body component 1. This circumferential area 21 of reduced diameter extends in the axial direction from the end edge 23 which adjoins adjoining the front surface 25 of the second body component 3 to the vicinity of the gap 15. The A step 27 connecting connects the circumferential area 21 to the circumference 19 of the first body component 1 and delimits, together with the gap 15, a wall component 29 by way of which joining the first body component 1 and second body component 3 are joined as one piece. The thickness selected for this wall component 29, which thickness is determined by the distance between the gap 15 and the axially inner end of the circumferential area 21, is such that the wall component 29 forms a A to form a weak point, @ that is, represents and to provide a flexible wall component which, when. When the threaded ring is produced from a steel material, wall component 29 permits flexible adjustment of the second body component 3 in relation to the first body component 1, with corresponding adjustment of the geometry of the gap gap 15 being effected, the. The gap width being is modified locally, for example.

Set screws 31, which extend through the gap 15 in parallel with the axis, extending and into threaded bores bores 33 in the first body component 1, and resting by way of their. Their screw heads 35 rest or bear against the second body component 3, are provided as. The set screws are an actuating mechanism for adjustment of the geometry of the gap 15. The set Set screws 31 are uniformly distributed over a graduated circle concentric with the axis of the threaded ring, six set screws being provided, for example. In the present example, the set screws 31 are configured as screws with recessed hexagon socket screws, the sockets in heads 35 of which. The heads 35 are seated in an enlarged end section sections of an associated through borebores 37 so that the free ends of heads 35 are more or less flush with the outer front surface 25 of the second body component component 3.

FIG. 1 shows the threaded ring in the unsecured state, with a threaded flank clearance present ~~ef~~in the threading engagement of internal threading 5 and external threading 7 ~~being~~. The clearance is shown enlarged for the sake of clarity of presentation. As is to be seen, the flank surfaces of the internal threading 5 positioned on the right side in the drawing are positioned a distance from the flank surfaces of the external threading 7 positioned on the left side in the drawing.

FIG. 2 shows the threaded ring in the secured state, ~~in which~~, as a result of tightening of the set screws 31, ~~the~~. The second body component 3 is braced against the first body component 1 (the drawing being exaggerated in that the front surface 25 of the body component 3 is slightly inclined toward the end surface of the screw heads 35) ~~so that in the instance of~~. For the second body component 3, the flank surfaces of the internal threading 5 is positioned on the right side rest on the left flank surfaces of the external threading 7, ~~while in the instance of~~. For the first body component 1, ~~the~~ left flank surfaces of the internal threading 5 rest on right flank surfaces of the external threading 7, ~~so that~~. In this manner, the unit of the threaded ring made up of body components 1 and 3 braced against each other is secured.

The threaded ring claimed for ~~of the~~ the present invention is designed to be rotationally symmetrical and has no grooves, slots, etc. generating unbalance. The set screws 31 evenly distributed over a concentric graduated circle, in conjunction with the flexible configuration of the wall ~~component~~ component 29, produce uniform clamping forces on the threading. These clamping forces ensure intensive contact of internal and external threading 5 and 7 and accordingly high axial rigidity of the threaded ring over the entire circumference. Any form defect adjustments and surface compressions which may be present may be evened out during assembly by increased tensioning of the body components 1 and 3. The plane planar surface 11 of the first body component 1 functioning as set collar or tightening ring may be adjusted by

targeted uniform tightening of the set screws ~~screws~~ 31 until complete balance is achieved. If necessary, individual set screws 31 may be additionally tightened to compensate for tension on one side caused by the smallest errors of plane extension of the adjacent components.

As has been stated, the mutual positioning of gap 15 and the axially inner end of the circumferential area 21 of reduced diameter on the second body component 3 defines the wall thickness of the elastically flexible wall component 29. Configuration of the circumferential area 21 is extremely simple with respect to production technology. The degree of flexibility of the wall component 29 is also determined by the distance between the radially outer end 17 of the gap 15 and the ~~circumference~~ circumference 19 of the first body component 1. This radial distance may be determined with no problems with respect to production by selection of the depth of recess of the inner recess forming the gap 15-.

Claims

1. A threaded ring the one piece body of which provided with internal threading (5) has two body components (1 and 3) one of which forms a set collar with a plane surface (11) positioned on the end in a radial plane and the other body component (3) of which forms a retaining ring which is connected to the first body component (1) to form a gap (15) positioned between the two body components (1 and 3) by way of an elastically flexible wall component (29) of the body and has an actuating mechanism (31) by means of which the geometry of the gap (15) may be adjusted on the basis of the elastic flexibility of the wall component (29), characterized in that the second body component (3) functioning as a retaining ring has for the purpose of forming the elastically flexible wall component (29) a circumferential area (21) which is reduced in relation to the first body component (1) to an external diameter which is situated over a radius smaller than the radially outer end (17) of the gap (15), which in turn is situated over a smaller radius than the circumference (19) of the

~~first body component (1), and in that the circumferential area (21), of smaller diameter, of the second body component (3) ends an axial distance from the gap (15) which defines the extent of the flexible wall component (29) in the axial direction.~~

- ~~2. The threaded ring as claimed in claim 1, wherein the circumferential area (21), of reduced external diameter, of the second body component (3) is in the form of a cylindrical circumferential surface which extends from the edge (23) on the end side adjoining the front surface (25) of the second body component (3) to the flexible wall component (29).~~
- ~~3. The threaded ring as claimed in claim 1 or 2, wherein the actuating mechanism has a plurality of tightening means (31) permitting modification of the width of the gap (15) at selected points.~~
- ~~4. The threaded ring as claimed in claim 3, wherein set screws (31) are provided as tightening means which are positioned evenly over a coaxial graduated circle, extend through the gap (15) in parallel with the axis, and rest by their screw heads (35) on the second body component (3).~~
- ~~5. The threaded ring as claimed in claim 4, wherein the screw heads (35) of the set screws (31) are seated recessed into the front surface (25) of the second body component (3).~~
- ~~6. The threaded ring as claimed in claim 5, wherein hexagon socket screws (31) are provided as set screws the screw heads (35) of which are more or less flush with the front surface (25) when recessed into the front surface (25).~~

While one embodiment has been chosen to illustrate the invention, it will be understood by those skilled in the art that various changes and modifications can be made therein without departing from the scope of the invention as defined in the appended claims.

What is claimed is

THREADED RING FOR LOCKING ON A THREADED SPINDLE

Abstract of the Disclosure

A threaded ring has a single-componentpiece body provided with an internal screw thread and two parts (1 and 3). The first part forms an adjusting ring having an end face (11) located in a radial plane. The second part (3) forms a retaining ring connected to the first part (1) of the body by an elastically flexible wall part (29) of the body forming a gap (15) between the two parts of the body (1 and 3). An actuating device (31) permits the geometry of the gap (15) to be adjusted due to the elastic flexibility of the wall element (29). The second part (3) of the body, used as a retaining ring, has a peripheral region (21) for the formation of the elastically flexible wall element (29), and has a smaller outer diameter than the first part (1). The outer diameter of the peripheral region is located on a smaller radius than the radially outer end (17) of the gap (15). The outer end of the gap, in turn, is located on a smaller radius than the periphery (19) of the first part (1) of the body. The peripheral region (21) of the second part (3), with a reduced diameter, ends at an axial distance from the gap (15), defining the extension of the flexible wall element (29) in the axial direction.